Using Milk Urea Concentration to Prevent Protein Overfeeding

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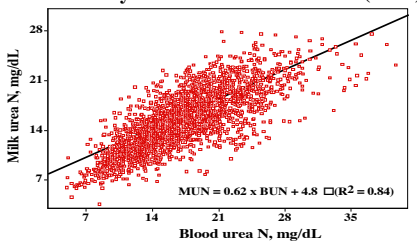
INTRODUCTION

Urea is the major nitrogen waste product excreted by the cow and excess dietary crude protein will be appear mainly as urinary urea. Milk urea nitrogen (MUN) is strongly related to urea excretion in the urine. Research conducted at the Dairy Forage Center helped establish the value of MUN as an index farmers can use to monitor wasteful overfeeding of crude protein.

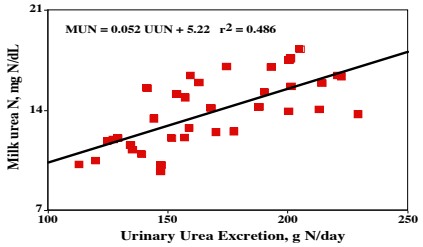
METHODS

1. Milk Urea N (MUN) & Blood Urea N (BUN) were Measured in 35 Lactation Trials.
2. Relationships Between MUN & Several Animal & Diet Factors were Looked for.
2. A Total of 2231 Data Points were Obtained from 482 Lactating Cows (50 Rumen Cannulated) fed 106 Diets.
4. Some Applications of the Findings are Shown Here.

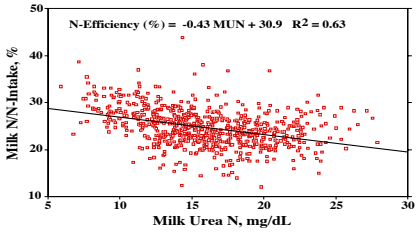
MUN is Closely Related to Blood Urea N (BUN).



MUN is Related to Urea Excretion.



N-Efficiency in the Cow is Related to MUN.



USEFUL RELATIONSHIPS

1. Relationship of Dietary Crude Protein (CP) to MUN:
   CP, % of DM = 0.27xMUN + 13.7 (R^2 = 0.84)
2. Relationship of CP/NE_L to MUN:
   CP/NE_L, lb/Mcal = 0.0039xMUN + 0.19 (R^2 = 0.83)
3. MUN Range Around an Average that Covers 95% of the no. of Cows fed a Specific Diet:
   Range = ±($t_{.05}$xStd Deviation)/√no. = ±(1.96xSD)/√no.

APPLICATIONS

1. Reliability of an MUN Value:
   a. Farmer Changed Alfalfa Silos; Average MUN for 25 High Group Cows Dropped from 14.5 to 9.0 mg/dL.
   b. MUN Std Deviations (use your calculator) were ~4.
   c. Was this Drop Really Important?
      Range = ±(1.96x4)/√25 = ±8/5 = ±1.6
      MUN Range = 12.9 to 16.1 mg/dL (Silo 1)
      MUN Range = 7.4 to 10.6 mg/dL (Silo 2)

   95% (24 out of 25) of the Cows Would Fall into 2 Very Different Ranges. This Drop in MUN Can't be Ignored.

2. Estimating Diet Crude Protein from MUN:
   a. How Much did Diet Crude Protein (CP) Fall with the Change in Silage?
      CP = 0.27x14.5 + 13.7 = 17.6% (Silo 1)
      CP = 0.27x9.0 + 13.7 = 16.1% (Silo 2)

   Estimated Diet CP Fell 1.5%. Send Samples of New Silage for Lab Analysis--Pronto!

SUMMARY

1. MUN is Strongly Related to Blood Urea N & Urinary Urea N Excretion.
2. N-Inefficiency is Closely Related to MUN Levels.
3. MUN can be used to Identify Diets that are Too Low or Too High in Crude Protein.